Preliminary comparisons of the error budgets associated with ground-based FTIR measurements of atmospheric HCl and HF profiles at Île de la Réunion and Jungfraujoch

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The Fourier Transform Infra Red (FTIR) remote measurements of atmospheric constituents at the observatories at Saint-Denis (20.90°S, 55.48°E, 50 m a.s.l., Île de la Réunion) and Jungfraujoch (46.55°N, 7.98°E, 3580 m a.s.l., Switzerland) are affiliated to the Network for the Detection of Atmospheric Composition Change (NDACC). The responsible scientists deliver retrieved vertical concentration profiles of constituents that are important players in the stratospheric ozone cycle, on a regular, rapid delivery basis to the GEOmon data center, and – once consolidated – to the NDACC database. For the users of the data and in particular for trend analyses, it is important that errors and uncertainties associated to these data are well characterized.

In this poster we therefore present a preliminary study of the comparison of errors on retrieved vertical concentration profiles of HCl and HF (up to 100 km altitude) between Saint-Denis and Jungfraujoch. Both HCl and HF originate from photolysis of organic Cl- and F-containing source gases (e.g. CFCs and HCFCs) in the stratosphere. These reservoir species are used as indicators for the amount of emitted organic precursor gases.

At both stations, we have used the same retrieval algorithm, namely SFIT2 v3.92 developed jointly at the NASA Langley Research Center, the National Center for Atmospheric Research (NCAR) and the National

Institute of Water and Atmosphere Research (NIWA) at Lauder, New Zealand, and error evaluation tools developed at the Belgian Institute for Space Aeronomy (BIRA-IASB). The error components investigated in this study are: smoothing, noise, temperature, instrumental line shape (ILS) (in particular the modulation amplitude and phase), spectroscopy (in particular the pressure broadening and intensity), interfering species and solar zenith angle (SZA) error. We will determine if the characteristics of the sites in terms of altitude, geographic locations and atmospheric conditions produce significant differences in the error budgets for the retrieved HCl and HF vertical profiles.